LYME DISEASE

1. **Agent**: *Borrelia burgdorferi*, a spirochete first identified in 1982.

2. **Identification:**

   a. **Symptoms**: Lyme borreliosis generally occurs in stages.

   Early Lyme Borreliosis: Although stages may overlap or occur alone, illness may begin with a characteristic skin lesion called erythema migrans (EM) in 60% of cases. This rash appears as a red macule or papule that expands in an annular manner, sometimes with multiple similar lesions. Fever, malaise, fatigue, headache, stiff neck, myalgia, migratory arthralgias, and lymphadenopathy may accompany or precede EM.

   Neurologic Manifestations: Weeks to months after the onset of early Lyme disease, neurologic abnormalities may develop in untreated patients. The typical pattern is fluctuating meningoencephalitis with superimposed cranial (particularly facial) nerve palsy and peripheral radiculo-neuropathy.

   Cardiac Manifestations: Within several weeks after onset, about 8% of untreated patients develop cardiac involvement (most commonly fluctuating degrees of atrioventricular block that resolves spontaneously).

   Arthritis: Weeks to years after the original illness, about 50% of untreated patients develop arthritis. Early involvement typically is manifested by migratory pain, often without swelling. Frank arthritis may develop subsequently with marked swelling and pain in one or more joints, primarily large joints, e.g., the knee.

   b. **Differential Diagnosis:**

   Early disease: Aseptic meningitis, hepatitis, mononucleosis, ehrlichiosis.

   Late disease: Rheumatic fever, disseminated gonococcal infection, multiple sclerosis, Guillain-Barré syndrome, Reiter's syndrome, rheumatoid arthritis, oligoarticular form of juvenile rheumatoid arthritis.

   c. Diagnosis: Based on clinical findings and history of possible exposure to infected *Ixodes* sp. ticks. Serological testing (EIA or IFA) may be useful but lacks sensitivity, especially in early disease. A two-step testing procedure using flagellar protein-based EIA followed by IgM and IgG Western blot of all positive and equivocal specimens is recommended. Culture from biopsy at the outer margins of EM lesion is 90% sensitive. PCR is available from research laboratories.

3. **Incubation**: 7-10 days average, range 3-32 days.

4. **Reservoir**: Wild animals; e.g., *Neotoma* spp. (wood rat) and deer are important in California.

5. **Source**: Infected *Ixodes* species ticks; other arthropods have been found containing *B. burgdorferi*, but their ability to transmit is questionable.

6. **Transmission:** Bite of *Ixodes* tick. 36-48 hours of attachment is usually required for transmission.

7. **Communicability:** Not transmitted from person to person.

8. **Specific Treatment**: Amoxicillin is a good treatment for adults or children with early disease. Doxycycline in adults and phenoxymethyl penicillin for children with early disease resolves illness and reduces the likelihood of later complications. Intravenous penicillin or ceftriaxone is effective for meningitis, late stage, and refractory illness.

REPORTING PROCEDURES

1. Report any cases or suspected cases within 7 calendar days to ACDC or Morbidity Unit.

California Code of Regulations, Title 17, Section 2500.

2. **Report Form**: **LYME DISEASE CASE REPORT (CDPH 8470)**.

3. **Epidemiologic Data:**

   a. Travel 30 days prior to onset of erythema migrans or early disease.

   b. History of tick bite.

   c. History of possible exposure to ticks, e.g., hiking in chaparral, dogs with ticks, etc.

   d. Occupational exposure.

CONTROL OF CASE, CONTACTS & CARRIERS

Investigation not required by district staff. Advise ACDC regarding suspect cases; ACDC will supply diagnosing physician with appropriate form or investigate. Initiate investigation within 7 days of notification.

CASE: Isolation: None.

CONTACTS: No restrictions.

CARRIERS: Not applicable.

PREVENTION-EDUCATION

1. Use tick repellents.

2. Wear protective clothing in wooded areas.

3. Control ticks on domestic animals.

4. Avoid tick-infested areas when feasible.

5. Check periodically for and carefully remove attached ticks after return from tick-infested areas.

DIAGNOSTIC PROCEDURES

Serology: Done by commercial laboratories. No longer run at State Laboratory or LAC Public Health Laboratory. Can be run at CDC with prior approval.

Container: Red top or serum separator tube.

Laboratory Form: N/A

Examination Requested: IFA/EIA and Western blot.

Material: Serum.

Amount: 0.5 mL.

Storage: Sera may be stored at 2°-8°C for up to 14 days. If testing is delayed for a longer period, serum samples may be frozen.

Remarks: Laboratory testing is not recommended for patients who do not have symptoms typical of Lyme borreliosis. Serologic tests for Lyme borreliosis lack sensitivity and are not standardized, so interpretation of test results is difficult. CDC recommends a two-step laboratory testing process: an EIA or IFA screening test followed by Western blot interpreted using established criteria. The two tests are to be done together. Skipping the EIA/IFA screening test and performing only the Western blot will increase the frequency of false positive results.

New tests may be developed as alternatives to the two-step process. However, these are often not FDA-approved nor recommended by the CDC.